

THE CLAIMS DEFINING THE INVENTION ARE:

1. A hand tool comprising:

a body,

a motor contained within the body,

a void space between an internal surface of the body and at least a part of the motor,

a fluid inlet port provided in or on the body,

a fluid outlet port provided in or on the body, and

ducting means which provides a channel for fluid supplied via the fluid inlet port through the void space and then on to the fluid outlet port,

said fluid outlet and inlet ports are connectable to fluid supply and fluid extraction conduits respectively,

characterised in that a fluid is supplied to said fluid inlet from an external fluid source.

2. A hand tool as claimed in claim 1 wherein said supply conduit and/or extraction conduit are releasably attachable to said fluid inlet and said fluid outlet respectively.

3. A hand tool as claimed in claim 1 including a fluid transport means capable of providing fluid flow from said external fluid source through said void space via the supply conduit and egressing via the extraction conduit.

4. A hand tool as claimed in claim 1 wherein said motor is a brushless DC motor.
5. A hand tool as claimed in claim 1 including a controller employed to monitor the temperature of the hand tool or at least one component therein and/or the level of power supply and/or the level of fluid supply to the hand tool.
6. A hand tool as claimed in claim 5 wherein the controller includes motor diagnostic equipment.
7. A hand tool as claimed in claim 5 wherein said controller is capable of providing a signal to a computer monitoring system to indicate said temperature, level of power supply and/or level of fluid supply.
8. A hand tool as claimed in claim 7 wherein the computer monitoring system regulates the power supply and/or fluid supply if said controller indicates that the temperature, level of power supply and/or level of fluid supply is outside of predetermined limits.
9. A hand tool as claimed in claim 5 wherein said controller is capable of providing a signal to a visible indicator system to indicate the level of power supply and/or level of fluid supply.
10. A hand tool as claimed in claim 9 wherein the visible indicator system is capable of indicating if the temperature, level of power supply and/or level of fluid supply is outside of predetermined limits.
11. A hand tool as claimed in claim 5 wherein the controller is mounted remotely to the hand tool.
12. A hand tool as claimed in claim 5, wherein the controller includes an emergency power "off" or power disabling switch.

13. A hand tool as claimed in any of claim 5, wherein said controller controls energisation of the motor.
14. A hand tool as claimed in claim 1, wherein the motor is sealed within a motor housing, the void space existing between the internal surface of the body and at least a part of the motor housing.
15. A hand tool as claimed in claim 1, wherein the fluid supplied to the void space provides cooling to the motor.
16. A hand tool as claimed in claim 1, wherein the fluid supplied to the void space is a compressed pneumatic fluid.
17. A hand tool as claimed in claim 1, wherein the fluid supplied to the void space is at a pressure greater than the external environment pressure.
18. A hand tool as claimed in claim 1, wherein the ducting means causes the fluid supplied to the fluid inlet port to, within the void space, first travel in a direction parallel to the axis of the body and motor housing and then to travel about the axis before again travelling along the axis to the fluid outlet port.
19. A hand tool as claimed in claim 1, wherein the fluid supplied to the void space maintains the motor temperature between about 35°C to about 50°C, and/or maintains the external temperature of the body between about 25°C to about 40°C.
20. A hand tool as claimed in claim 1, wherein the fluid supplied to the void space is provided at between about 15 L/min to about 35L/min, at between about 1.5 Bar to about 3.0 Bar, and at between about 8°C to about 22°C.
21. A hand tool as claimed in claim 1, wherein fluid is supplied to the void space only when the motor is operational.

22. A hand tool as claimed in claim 1, wherein the supply conduit also provides electrical power to the motor.
23. A hand tool as claimed in claim 1, wherein fluid is supplied to the void space only when the supply conduit is connected to the body.
24. A hand tool as claimed in claim 1, wherein said hand tool includes a power output means connected to the motor.
25. A hand tool as claimed in claim 24, wherein the power output means is a shaft capable of providing a driving force to a connected implement.
26. A hand tool as claimed in claim 25, wherein the implement may be an implement selected from one of the following types: a rotateable circular blade, a reciprocating blade, a pair of connected reciprocating blades, a rotating drum past a blade, a universal connection means able to attach or fit or house a tool.
27. A hand tool as claimed in claim 24, wherein the power output means comprises a rotating shaft, a toothed wheel or cog, disc or other suitable gear head.
28. A hand tool as claimed in claim 24, wherein the power output means includes a gearing system able to translate the power output by the shaft to a pre-determined speed or torque.
29. A hand tool as claimed in claim 1, wherein said hand tool includes a rotor position sensing means which outputs a signal which enables the position of the motor's rotor to be determined.
30. A hand tool as claimed in claim 29, wherein the rotor position sensing means comprises a Hall effect sensor.

31. A hand tool as claimed in claim 29, wherein energisation of the motor is determined at least in part on the basis of the rotor position signal.
32. A hand tool as claimed in claim 5, wherein the controller receives manual speed demand input and varies the output speed and/or torque of the motor accordingly.
33. A hand tool as claimed in claim 1, wherein a power switch handle is used to activate the hand tool.
34. A hand tool as claimed in claim 33, wherein activation is achieved by pushing a base of a plunger on the handle forward against a biasing force and enabling activation of a sensing switch.
35. A hand tool as claimed in claim 34, wherein activation of the switch may be via movement of a bevelled surface of the plunger against the switch and then by holding the handle down flush with the hand tool body.
36. A hand tool as claimed in claim 1, wherein a switch is provided for switching electrical supply to the motor on and/or off.
37. A hand tool as claimed in claim 36, wherein said switch is a non-contact magnetic reed switch located within the body which is sealed.
38. A hand tool as claimed in claim 1, wherein the hand tool includes a power input means adapted to be supplied with an input DC voltage via a connectable power cable.
39. A hand tool as claimed in claim 38, wherein the power input means comprises a quick-release plug or socket type arrangement.
40. A hand tool as claimed in claim 1, wherein the hand tool includes heat

dissipation and/or insulation means.

41. A hand tool as claimed in claim 40, wherein the heat dissipation means are cooling fins.
42. A hand tool as claimed in claim 40 , wherein the heat dissipation and/or insulation means substantially surrounds heat generating hand tool components and substantially reduces heat transfer from said hand tool body from transferring heat to an operator.
43. A hand tool as claimed in claim 1, wherein the hand tool is constructed of metal, plastics or composite materials.
44. A hand tool as claimed in claim 1, wherein the body is sealed.
45. A hand tool as claimed in claim 1, wherein the body is substantially cylindrical in shape and sized to fit into a user's hand.
46. A hand tool as claimed in claim 1, wherein the motor housing and body are both substantially cylindrical in shape and are aligned coaxially with the void space existing over substantially all of the radially extending region between the motor housing and body.